

Chapter Two: Massachusetts Landscape Perspective: A History of Land Use in Massachusetts

Post-glacial to European Settlement Period

The Native Americans who inhabited the Massachusetts region for thousands of years following the retreat of the last glacial ice sheet left no written records. Archeological excavations in the Commonwealth have been interpreted and reinterpreted over the years by various researchers, yielding an emerging picture of a native population whose members are probably best termed “mobile farmers.” The estimated pre-colonial population in New England based on the archeological record is thought to have been about 70,000, with most of the inhabitants occurring in Massachusetts, Connecticut and Rhode Island. Burning of fields was certainly part of their agricultural practice, but the extent of the burns appears to have been limited primarily to areas near their semi-permanent settlements; not expanded to a regional scale as appears to have been the case among the tribes in the Great Lakes region.

Some first-hand information reported by early European explorers and fishermen does exist, but unfortunately these accounts do not reveal much beyond what could be seen from a ship passing near the coast, and even this information must be viewed with suspicion since at least some of the individuals who wrote the accounts were in the business of promoting others to come to the new land. Beginning in the 1500s, European fisherman and explorers visited the New England coast and spread diseases which were common in Europe but unknown in the new world. These diseases wiped out much of the native population prior to the time the Pilgrims set foot on Plymouth Rock. This left the landscape around the Native American settlements in a state of change, with fields going fallow because of the much reduced population.

Data from sediment core samples taken from undisturbed lakebeds reveal charcoal and pollen layers which have provided empirical evidence regarding the intensity and frequency of fires occurring in the area, and the species of pollen producing plants and their relative abundance through time. What is clear from the evidence we are left with is that most of the interior of the state (about 90% according to Harper, 1918) was covered by thick forest. Some areas along the coast and along major river systems like the Connecticut and Merrimack had areas where croplands were burnt to keep them open, but by and large the majority of habitat was unchanged by man. That is not to say that the landscape was in any way static. Indeed, the pollen record shows that the American chestnut tree which was such an important food source to wildlife throughout the eastern U.S. was a relatively recent arrival to the landscape of Massachusetts, and that the Eastern hemlock, which today is being threatened by the spread of the wooly adelgid, had once before been driven to low numbers, presumably by another disease or parasite.

Shortly after the Pilgrims settled at Plymouth they experienced their first hurricane. Hurricanes moving northward in the Atlantic Ocean periodically make landfall in New England. The frequency of hurricanes with winds strong enough to topple trees on a large scale diminishes from east to west. South coastal Massachusetts and Cape Cod are hit by winds from these storms about once every 85 years. The North Shore, central Massachusetts and the Connecticut River

Valley are hit by hurricane force winds strong enough to blow down trees about once every 150 years. The Berkshires are hit by these strong winds once every 380 years.

Settlement and Early Agriculture

The process for settling this new land involved granting an area of land to a group of individuals to form a new town. Most of the land in these towns was privately held. Farming began on a self-sufficient scale, but quickly began to change as trade between Europe and the West Indies grew. Forest clearing expanded rapidly, and by about 1700 the eastern one third of what was to become the Commonwealth of Massachusetts and the Connecticut River Valley was already settled. Cardoza (1976) quotes from *American Husbandry*, written in 1775, and cited in Carmen 1939 that “timber...even firewood in some parts is not cheap...owing to the planters, upon their first settling, ravaging rather than cutting down the woods... They not only cut down timber to raise their buildings and fences, but in clearing the ground for cultivation they destroy all that comes in their way...Instead of acting in so absurd a manner, which utterly destroys woods of trees which require an 100 years to come to perfection, they ought...to enclose and reserve portions of the best woods for the future use of themselves and the general good of the country...” (Carmen 1939).

This lesson, for the most part, was entirely lost on the early settlers. Woods that were left for timber or fuel production were primarily coppice growth and were harvested about every twenty years or less. The loss of forest habitat had a dramatic impact on the landscape of Massachusetts and brought about equally dramatic changes in wildlife species composition and abundance. Hunting for food, and trapping to supply European markets, had a dramatic effect on several important species. To give a sense of the rapid decline in the beaver population, Cardoza 1976 quotes from the business records of John Pynchon (a Springfield, Massachusetts-area fur trader of the period) that he shipped 8,992 whole beaver pelts during the years 1652-1657, while only 6,480 pelts were shipped in the years 1658-1674. Beaver were eliminated from most of the state by 1700. Most other furbearers, game mammals, game birds and waterfowl populations also declined precipitously during the colonial period due to over-hunting and/or habitat loss.

White-tailed deer were common when settlers first reached the shores of Massachusetts. However, by 1698 the population was driven so low that, according to Bernardos et al. 2004, “In 1698, Massachusetts placed a closed season on deer between January 15 and July 15 and then enacted a three-year moratorium on deer hunting in 1718 when under-enforcement of the original law and habitat loss led to further declines.” Bird species such as wild turkey, pileated woodpecker, raven, osprey, eagle and great blue heron also declined due to over-hunting and/or habitat loss during this period. The wild turkey, which had been common at the time of European settlement, was extirpated from the state, and was not successfully reintroduced until the 1970s.

Yet while these species were in decline, other species such as bobolink, meadowlark, striped skunk, woodchuck and cottontail rabbit – all of which thrived in the open grasslands created by farming – began to increase in abundance.

1790 – 1860

The “post-colonial” era marked the peak in agricultural activity, and therefore deforestation, in the state. Sheep production for wool boomed in Massachusetts and central New England. Steep

hillsides which could not be tilled for row crops were cleared and converted into sheep pastures. Soil erosion from these steep hillsides helped to degrade streams and rivers and exacerbated the direct loss of forest habitat. By 1850 the last wolf had disappeared from the Massachusetts landscape, the result of constant persecution combined with habitat loss. The last wild turkey disappeared from the state in 1851, the victim of habitat loss and overzealous market hunting.

This was also the time of Henry David Thoreau. He recognized how the history of land-use had shaped the landscape of the mid-1800s. Fields that had been burnt over by the Native Americans were being tilled by European immigrants. Thoreau could still find remnants of the forests that had once covered the land, and he argued for the protection of those areas of forest that remained. Information regarding wildlife and its habitat improved greatly during the period. The Massachusetts Legislature required that each city and town complete a map which showed land-use in great detail, documenting the change from forest to field (see Figure 1). Peabody's *A Report on the Ornithology of Massachusetts* was published in 1839.

This was a time of great change in the landscape of Massachusetts, and like Thoreau, others worried that the species and the habitat that they knew would not exist in the future. H. W. Hebert wrote in 1848 under the pen name Frank Forester: "The deer and the great American hare...are likewise already extinct in many places...Within fifty years...I am satisfied that the Woodcock will be as rare in the eastern and midland states as the Wild Turkey and Heath Hen are at present. The Quail will endure a little longer, and the Ruffed Grouse the longest of all – but the beginning of the twentieth century will see the wide woodlands, the dense swamps, and the mountain sides, depopulated and silent." (Forester 1914). While these forest dwelling species were undergoing steep declines, other grassland bird species were flourishing.

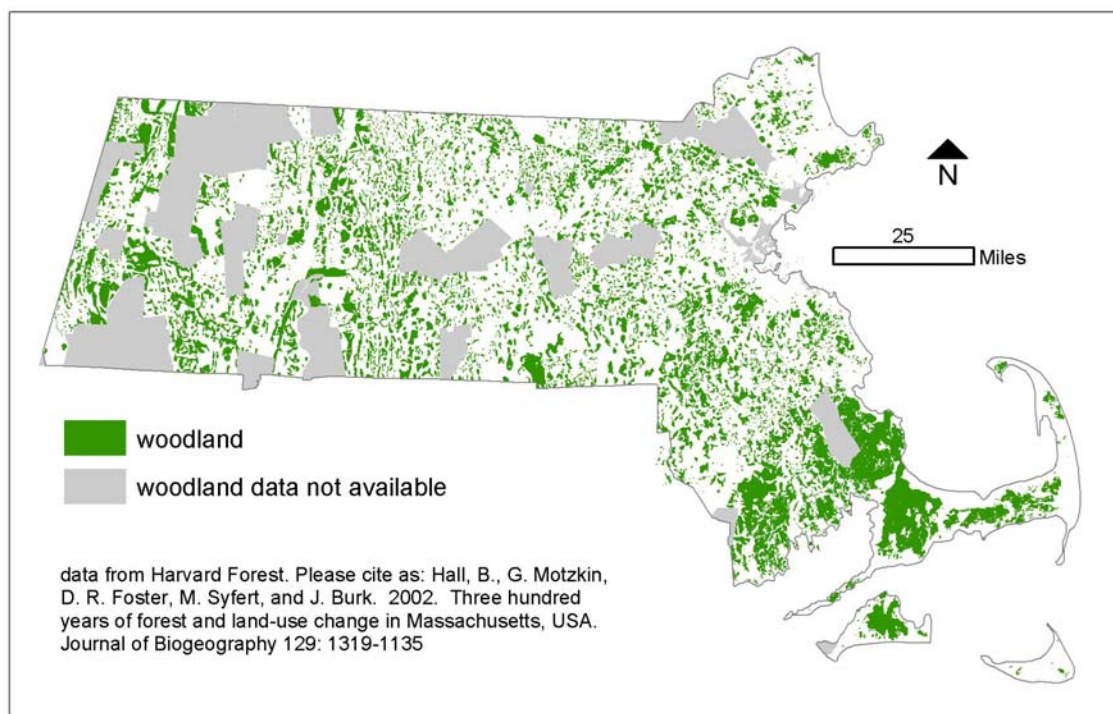


Figure 1: Areas of Massachusetts forested in the 1830s.

Industrial Revolution

Again, as has been typical in the Commonwealth, American history made substantial advances in the mid 19th century on the back of the Massachusetts landscape. Following the mostly agrarian economy of pre-1800s America, the roots of American industry grew in the planned textile mill city of Lowell, Massachusetts. This coincided with a transportation revolution: between 1790 and 1860, canals, turnpikes and railroads crisscrossed the nation. Starting in 1796 in Massachusetts, early transportation pioneers and investors built locks and canals along the Merrimack River. They intended to connect New Hampshire industry and transportation all the way to the Atlantic Ocean at Newburyport.

Based on European technology, Francis Cabot Lowell built the first power loom in 1810, and by 1850 he controlled 20% of America's cotton production. The power was efficiently harnessed at Pawtucket Falls on the Merrimack River, just south of New Hampshire, and the operation eventually involved six miles of canals. Anticipating drought, Lowell purchased water rights well into New Hampshire and soon turned the entire Merrimack watershed into a giant mill pond! He could pool water or release it downstream as desired.

The birthplace of America's industrial revolution in Lowell, Massachusetts is a story as much about change as it is about beginnings. People completely transformed the way they lived. Instead of depending on natural cycles to run family farms, people went to work in factories and cycled around the sound of the factory whistle. Factories worked around the clock and depended on local labor – including the allegedly “worthless” daughters of farmers called “mill girls.” Instead of living in rural areas, they came to live in fast-growing urban areas like Lowell, Lawrence and Worcester.

Nationally, the opening of the West via the Erie Canal brought great changes as well. Flourishing hillside farms were suddenly abandoned as agriculture moved westward. Pastured hillsides were the first to begin the process of succession to forest. Farming in the river valleys continued, but the types of crops changed and agriculture grew more intensive. Between 1860 and 1870, nearly 320,000 acres of cropland (129,313 hectares comprising 16% of the Massachusetts land base) were abandoned in Massachusetts alone (Trefethen 1953). The combination of the industrial revolution and the decline of local agriculture set the stage for a landscape that we struggle to manage to this day.

Land Trust Movement

As is becoming a common theme throughout this document, once again Massachusetts' history comes alive as the birthplace of something important: the land trust movement. In 1891, The Trustees of Reservations, the first private, non-profit land trust, was founded by landscape architect Charles Eliot. Interestingly, the scale of development around Boston at that time was so rapid that Eliot was concerned that city dwellers would lose touch with the countryside if specific places of natural beauty were not preserved.

The idea of preserving land for public enjoyment spread, first to surrounding New England states (the Society for the Protection of New Hampshire Forests was formed in 1901) and eventually all the way to California, where the Save-the-Redwoods League was formed in 1917. More than 400

land trusts existed in the U.S. by 1980, nearly 900 by 1990, and by 2000 there were 1,263. In addition, land protection advocacy organizations such as the Sierra Club, The Nature Conservancy and many others were founded during the 20th century.

Today, some 113 years after the founding of the first land trust, Massachusetts leads the United States with a total of 143 land trusts in operation. California is second with 132. Nationally, local and regional land trusts have protected more than 6.2 million acres of open space according to a 2000 national survey. National groups such as The Nature Conservancy have protected millions of acres as well.

Despite its small size, Massachusetts ranks sixth in the nation for open space protection. Approximately one fifth of the state's acreage has been protected. We are in a unique position to develop a strategy to continue this legacy of protection into the future. For as impressive as these statistics are, approximately 57% of Massachusetts' acreage is still unprotected and undeveloped. Given the current pace of development – 46 acres per day or an area equal to paving over the Boston Common every 12 hours – a habitat protection strategy must be developed soon or functional ecosystems and our current biodiversity will not endure.

Suburbanization

The most recent census shows that Massachusetts was the only state in the union to lose population during the year. This has not, however, lessened the shift in population from the cities into the countryside. This migration into the suburbs has led to more and more land being used for development. Development restriction for environmental reasons, lands protected for agricultural purposes, and various other factors have caused forest lands to become the primary areas for new home development. Furthermore, the high cost of development in the state, in conjunction with a high standard of living, has led to larger and larger homes being built on larger, more widely spaced lots. Add to this the infrastructure of roads and sidewalks to service these new homes, and an estimated 75 acres of habitat are lost each day to development in the state (Audubon 2002). This direct loss of habitat due to development, combined with the effects of habitat fragmentation due to increased transportation infrastructure, has created a threat to wildlife not seen since the early days of the 19th century when the state was largely deforested. This time, however, the opportunity to reforest old farm fields abandoned by a westward exodus to the prairies is not likely to be repeated.

About 1,100,000 acres of the 5,200,000 acres of land in Massachusetts are developed. Another 1,100,000 acres enjoy some form of protection from development. This leaves 3,000,000 acres of undeveloped and unprotected land according to the Massachusetts Executive Office of Environmental Affairs.

References

Bernardos, D., D. Foster, G. Motzkin, and J. Cardoza. 2004. Wildlife dynamics in the changing New England landscape. Chapter 7 in: D. R. Foster and J. D. Aber (eds.). *Forests in Time: The Environmental Consequences of 1,000 Years of Change in New England*. Yale University Press, New Haven and London.

Cardoza, J. E. 1976. The History and Status of the Black Bear in Massachusetts and Adjacent New England States. M.S. Thesis, University of Massachusetts, Amherst, Massachusetts.

Carmen, H. J., ed. (1775) 1939. *American Husbandry*. Columbia Univ. Press, New York.

Forester, J. F. (1848) 1914. Frank Forester foresaw game destruction. *Forest & Stream* 82(3): 83-84, 90.

Harper, R. M. 1918. Changes in the forest area of New England in three centuries. *J. Forestry* 16(4): 442-452.